UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,351	03/09/2005	Yusuke Suzuki	S1459.70065US00	4788

23628 7590 11/07/2008

WOLF GREENFIELD & SACKS, P.C.
600 ATLANTIC AVENUE
BOSTON, MA 02210-2206

EXAMINER	
WONG, EDNA	
ART UNIT	PAPER NUMBER
1795	
MAIL DATE	DELIVERY MODE
11/07/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,351	SUZUKI ET AL.	
	Examiner	Art Unit	
	EDNA WONG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on October 27, 2008 has been entered.

This is in response to the Amendment dated October 27, 2008. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Claim Rejections - 35 USC § 102

Claims **1, 2 and 5** have been rejected under 35 U.S.C. 102(e) as being anticipated by **Fujimori et al.** (US Patent No. 6,683,244 B2).

The rejection of claims 1, 2 and 5 under 35 U.S.C. 102(e) as being anticipated by Fujimori et al. has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 102/103

Claims **3 and 4** have been rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Fujimori et al.** (US Patent No. 6,683,244 B2) as applied to claims 1, 2 and 5 above.

The rejection of claims 3 and 4 under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fujimori et al. as applied to claims 1, 2 and 5 above has been withdrawn in view of Applicants' amendment.

Response to Amendment

Claim Objections

Claim **4** is objected to because of the following informalities:

Claim 4

line 2, the word -- is -- should be inserted after the word "oxide".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. Claims **1-4 and 6-17** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention.

Claim 1

lines 5, recites "less than 15 Ω/cm^2."

Applicants' specification discloses transparent electrodes having a resistance of 5 Ω/cm^2 (page 11, line 14; page 12, lines 15 and 19; and page 13, lines 2, 6 and 10). The value of 5 Ω/cm^2 is not *a range* of "less than 15 Ω/cm^2."

line 7, recites "a light sensitizer".

Applicants' specification discloses *a sensitizing dye* and that semiconductor particles can be used as sensitizing materials as well as the organic sensitizing dyes (page 7, lines 11-21).

Claim 7

line 2, recites "about 5 Ω/cm^2 or less."

Applicants' specification discloses transparent electrodes having a resistance of 5 Ω/cm^2 (page 11, line 14; page 12, lines 15 and 19; and page 13, lines 2, 6 and 10). The value of 5 Ω/cm^2 is not *a range* of "5 Ω/cm^2 or less."

Claim 11

lines 1-2, recite "wherein the metallic oxide layer or derivative layer thereof comprises antimony."

Applicants' specification does not disclose antimony.

Claim 12

lines 1-2, recite "wherein the metallic oxide layer or derivative layer thereof comprises calcium."

Applicants' specification does not disclose calcium.

Claim 13

lines 1-2, recite "wherein the metallic oxide layer or derivative layer thereof comprises gallium."

Applicants' specification does not disclose gallium.

II. Claims **2, 4 and 14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2

lines 1-2, "the metallic oxide or derivative thereof" lacks antecedent basis. It is suggested that the word -- layer -- be inserted after the words "oxide" and "derivative".

Claim 4

line 2, "the metallic oxide" lacks antecedent basis. It is suggested that the word --

layer -- be inserted after the words "oxide".

Claim 14

line 2, "FTO" is indefinite. It is suggested that "FTO" be spelled out.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

I. Claims **1-4, 7, 14 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fujimori et al.** (US Patent No. 6,683,244 B2).

Fujimori teaches a photovoltaic element comprising:

(a) a transparent electrode comprising an ITO substrate **3** (= a layer-form (plate-like) first electrode) [col. 7, lines 20-29] and a metallic oxide layer or a derivative layer thereof **8** (= a barrier layer) [col. 12, lines 27-33], the ITO substrate being coated with the metallic oxide layer or derivative layer thereof (= on the top face of the first electrode **3**, a film-like barrier layer **8** is provided) [col. 7, lines 57-60; and Fig. 2], the metallic oxide layer or derivative layer being from 10 nm to 100 nm thick (= about 0.01 to 10 μm = about 10 to 10,000 nm) [col. 12, lines 22-26]; and

(b) a metallic oxide semiconductor layer **4** (= a porous electron transport layer)

contacting the metallic oxide layer or derivative layer thereof (= on the top face of the barrier layer **8**) [col. 7, lines 61-63; col. 7, line 66 to col. 8, line 9; and Fig. 2], the metallic oxide semiconductor layer comprising a light sensitizer **4+D** (= a dye layer) [col. 7, lines 61-65; col. 8, lines 40-42; and Fig. 2].

The metallic oxide or derivative thereof includes at least one element among Ti, Cu, Zn, As, Sr, Nb, In, Sn and W (= various kinds of metallic oxides, such as $SrTiO_3$, ZnO, SiO_2. Al_2O_3 and SnO_2) [col. 12, lines 27-33].

The photovoltaic element further comprises a metallic oxide semiconductor **4** (col. 7, line 66 to col. 8, line 9) carrying a dye **D** (col. 9, line 13 to col. 10, line 10) as an electrode of a dye-sensitized type solar cell (col. 8, lines 33-58; and Fig. 2).

The metallic oxide layer or derivative layer thereof comprises tin (= tin oxide (SnO_2)) [col. 12, lines 27-33].

The element of Fujimori differs from the instant invention because Fujimori does not disclose the following:

a. Wherein *the transparent electrode having a resistance* of less than 15 Ω/cm^2, as recited in claim 1.

b. Wherein the resistance of the transparent electrode is about 5 Ω/cm^2 or less, as recited in claim 7.

Fujimori teaches a transparent electrode comprising an ITO substrate **3** (= a layer-form (plate-like) first electrode) [col. 7, lines 20-29] and a metallic oxide layer or a

derivative layer thereof **8** (= a barrier layer) [col. 12, lines 27-33].

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Fujimori teaches the same transparent electrode as presently claimed. Similar structures can reasonably be expected to inherently have the same properties.

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical process, *a prima facie* of either anticipation or obviousness has been established (MPEP § 2112.01(I)).

c. Wherein when the metallic oxide *is held* for one hour in atmospheric air at 500°C, the rise of a resistance value is 10 Ω/cm^2 or lower, as recited in claim 3.

Fujimori teaches a metallic oxide layer or a derivative layer thereof **8** (= a barrier layer) [col. 12, lines 27-33].

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Fujimori teaches the same metallic oxide as presently claimed. A compound and all of its properties are inseparable. *In re Papesch*, 315 F.2d 381, 391, 137 USPQ 43, 51 (CCPA 1963) [MPEP § 2141.02(V)].

Furthermore, holding the metallic oxide for one hour in atmospheric air at 500°C is a process limitation. Process limitations do not structurally distinguish the element from the prior art.

d. Wherein a light transmittance of *the ITO substrate coated with the metallic oxide* in the wavelength range from 400 nm to 900 nm is 60% or higher, as recited in claim 4.

Fujimori teaches a transparent electrode comprising an ITO substrate **3** (= a layer-form (plate-like) first electrode) [col. 7, lines 20-29] and a metallic oxide layer or a derivative layer thereof **8** (= a barrier layer) [col. 12, lines 27-33].

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Fujimori teaches the same transparent electrode as presently claimed. Similar structures can reasonably be expected to inherently have the same properties.

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical process, *a prima facie* of either anticipation or obviousness has been established (MPEP § 2112.01(I)).

e. Wherein the metallic oxide layer or derivative layer thereof comprises FTO, as recited in claim 14.

Fujimori teaches:

"The constituent material of the barrier layer **8** is not limited particularly, but in addition to titanium oxide which is the principal material for the electron transport layer **4**, *various kinds of metallic oxide, such as $SrTiO_3$, ZnO, SiO_2, Al_2O_3 and SnO_2*, and various kinds of metallic compounds such as CdS, CdSe, TiC, Si_3N_4, SiC, B_4N and BN, for example, may be used. In this case, one kind or a combination of two or more kinds of these materials may be used. Among these materials, *a material having electrical*

*conductivity equivalent to that of the electron transport layer **4** is particularly preferred for the constituent material for the barrier layer **8***, and a material having titanium oxide as its principal constituent is more preferred. By constituting the barrier layer **8** with such a material, it is possible to transmit electrons generated in the dye layer **D** to the barrier layer **8** with high efficiency. As a result, the power generation efficiency of the solar cell **1A** can further be enhanced" (col. 12, lines 27-33).

Fujimori teaches that the barrier layer is preferably a material having electrical conductivity equivalent to that of the electron transport layer.

Fujimori teaches that the electron transport layer includes tin oxide (SnO_2) [col. 7, line 66 to col. 8, line 9].

Fujimori teaches that tin oxide (SnO_2) and fluorine-doped tin oxide (FTO) are functionally equivalent materials (col. 7, lines 20-29).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic oxide layer or derivative layer thereof described by Fujimori with wherein the metallic oxide layer or derivative layer thereof comprises FTO because fluorine-doped tin oxide (FTO) would have been functionally equivalent to tin oxide (SnO_2) as taught by Fujimori (col. 7, lines 20-29).

The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution. *Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989); *In re Leshin* 125 USPQ 416; *Lyon v. Bausch & Lomb* 106 USPQ 1; *Graver Tank & Manufacturing Co. V. Linde Air Products Co.* 85 USPQ 328 (Supr. Ct.) [MPEP § 2144.07].

II. Claims **6, 10 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable

over **Fujimori et al.** (US Patent No. 6,683,244 B2) as applied to claims 1-4, 7, 14 and 17 above, and further in view of **JP 10-92477** ('477).

Fujimori is as applied above and incorporated herein.

The element of Fujimori differs from the instant invention because Fujimori does not disclose the following:

a. ·Wherein the metallic oxide semiconductor layer *is sintered* on the transparent electrode, as recited in claim 6.

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because sintering the metallic oxide semiconductor layer on the transparent electrode is a process limitation. Process limitations do not structurally distinguish the element from the prior art.

Furthermore, JP '477 teaches that an oxide semiconductor film being formed from fired material of an oxide semiconductor particle aggregate and having a thickness of at least 10 nm has raised mechanical strength and strong adherence to a substrate (page 7, lines 2-6).

·Wherein *the metallic oxide layer or derivative layer thereof* prevents the resistance of the transparent electrode from rising more than 10 Ω/cm^2 *when* the metallic oxide semiconductor layer is sintered on the transparent electrode, as recited in claim 6.

Fujimori teaches that on the top face of the barrier layer **8**, there are provided a porous electron transport layer **4** and the dye layer **D** which is in contact with the

electron transport layer (col. 7, lines 61-63; and Fig. 2).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Fujimori teaches the same metallic oxide semiconductor layer and the metallic oxide layer or derivative layer thereof as presently claimed. Similar structures can reasonably be expected to inherently have the same properties.

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical process, *a prima facie* of either anticipation or obviousness has been established (MPEP § 2112.01(I)).

b. Wherein the metallic oxide layer or derivative layer thereof comprises niobium, as recited in claim 10.

c. Wherein the metallic oxide layer or derivative layer thereof comprises calcium, as recited in claim 12.

Fujimori teaches:

"The constituent material of the barrier layer **8** is not limited particularly, but in addition to *titanium oxide* which is the principal material for the electron transport layer **4**, *various kinds of metallic oxide, such as $SrTiO_3$, ZnO, SiO_2, Al_2O_3 and SnO_2*, and various kinds of metallic compounds such as CdS, CdSe, TiC, Si_3N_4, SiC, B_4N and BN, for example, may be used. In this case, one kind or a combination of two or more kinds of these materials may be used. Among these materials, a material having electrical conductivity equivalent to that of the electron transport layer **4** is particularly preferred for the constituent material for the barrier layer **8**, and a material having titanium oxide as its principal constituent is more preferred. By constituting the barrier layer **8** with such a material, it is possible to transmit electrons generated in the dye layer **D** to the barrier

layer **8** with high efficiency. As a result, the power generation efficiency of the solar cell **1A** can further be enhanced" (col. 12, lines 27-33).

Like Fujimori, JP '477 teaches solar cells. JP '477 teaches oxide semiconductors such as perovskite systems, such as $SrTiO_3$ and $\underline{Ca}TiO_3$, besides the oxide of transition metals, such as Ti, *Nb*, Zn, Sn, Zr, Y, La and Ta, etc. (page 2, [0005]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic oxide layer or derivative layer thereof described by Fujimori with (b) and (c) above because a metallic oxide layer or derivative layer thereof of niobium and calcium would have been functionally equivalent to TiO_2, $SrTiO_3$, ZnO and SnO_2 as taught by JP '477 (page 2, [0005]).

III. Claims **8-9 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fujimori et al.** (US Patent No. 6,683,244 B2) as applied to claims 1-4, 7, 14 and 17 above, and further in view of **JP 8-51224** ('224).

Fujimori is as applied above and incorporated herein.

The element of Fujimori differs from the instant invention because Fujimori does not disclose the following:

a. Wherein the metallic oxide layer or derivative layer thereof comprises copper, as recited in claim 8.

b. Wherein the metallic oxide layer or derivative layer thereof comprises tungsten, as recited in claim 9.

c. Wherein the metallic oxide layer or derivative layer thereof comprises

indium, as recited claim 16.

Fujimori teaches:

"The constituent material of the barrier layer **8** is not limited particularly, but in addition to *titanium oxide* which is the principal material for the electron transport layer **4**, *various kinds of metallic oxide, such as $SrTiO_3$, ZnO, SiO_2, Al_2O_3 and SnO_2*, and various kinds of metallic compounds such as CdS, CdSe, TiC, Si_3N_4, SiC, B_4N and BN, for example, may be used. In this case, one kind or a combination of two or more kinds of these materials may be used. Among these materials, a material having electrical conductivity equivalent to that of the electron transport layer **4** is particularly preferred for the constituent material for the barrier layer **8**, and a material having titanium oxide as its principal constituent is more preferred. By constituting the barrier layer **8** with such a material, it is possible to transmit electrons generated in the dye layer **D** to the barrier layer **8** with high efficiency. As a result, the power generation efficiency of the solar cell **1A** can further be enhanced" (col. 12, lines 27-33).

Like Fujimori, JP '224 teaches photoelectric conversion elements. JP '224 teaches that the device comprises a substrate, a transparent oxide electrode, a metal oxide layer, a substantially intrinsic semiconductor thin film, a n-type semiconductor thin film and an electrode (abstract). The metal oxide layer used comprises *indium oxide (In_2O_3)*, zinc oxide (ZnO), titanium oxide (TiO_2), *tungstic oxide (WO_2)*, nickel oxide (NiO), *copper oxide (CuO, CuO_2)* and iridium oxide (IrO_2) [page 4, [0011]].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic oxide layer or derivative layer thereof described by Fujimori with (a) to (c) above because a metallic oxide layer or derivative layer thereof of copper, tungsten and indium would have been functionally equivalent to TiO_2 and ZnO as taught by JP '224 (page 4, [0011]).

IV. Claim **11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Fujimori**

et al. (US Patent No. 6,683,244 B2) as applied to claims 1-4, 7, 14 and 17 above, and further in view of **Arao et al.** (US Patent No. 5,244,509).

Fujimori is as applied above and incorporated herein.

The element of Fujimori differs from the instant invention because Fujimori does not disclose wherein the metallic oxide layer or derivative layer thereof comprises antimony, as recited in claim 11.

Fujimori teaches:

"The constituent material of the barrier layer **8** is not limited particularly, but in addition to *titanium oxide* which is the principal material for the electron transport layer **4**, *various kinds of metallic oxide, such as $SrTiO_3$, ZnO, SiO_2, Al_2O_3 and SnO_2*, and various kinds of metallic compounds such as CdS, CdSe, TiC, Si_3N_4, SiC, B_4N and BN, for example, may be used. In this case, one kind or a combination of two or more kinds of these materials may be used. Among these materials, a material having electrical conductivity equivalent to that of the electron transport layer **4** is particularly preferred for the constituent material for the barrier layer **8**, and a material having titanium oxide as its principal constituent is more preferred. By constituting the barrier layer **8** with such a material, it is possible to transmit electrons generated in the dye layer **D** to the barrier layer **8** with high efficiency. As a result, the power generation efficiency of the solar cell **1A** can further be enhanced" (col. 12, lines 27-33).

Like Fujimori, Arao teaches solar cells. Arao teaches that the buffer layer is composed of a material selected from a material containing magnesium fluoride as the principal component, oxides, nitrides and carbides of indium, tin, cadmium, zinc, *antimony*, silicon, chromium, silver, copper, aluminum or magnesium (col. 5, lines 1-6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic oxide layer or derivative layer thereof described by Fujimori with wherein the metallic oxide layer or derivative layer thereof comprises antimony because a metallic oxide layer or derivative layer thereof of

antimony would have been functionally equivalent to SnO_2, ZnO and Al_2O_3 as taught by Arao (col. 5, lines 1-6).

V. Claim **13** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Fujimori et al.** (US Patent No. 6,683,244 B2) as applied to claims 1-4, 7, 14 and 17 above, and further in view of **Yamada et al.** (US Patent No. 6,566,162 B2).

Fujimori is as applied above and incorporated herein.

The element of Fujimori differs from the instant invention because Fujimori does not disclose wherein the metallic oxide layer or derivative layer thereof comprises gallium, as recited in claim 13.

Like Fujimori, Yamada teaches solar cells. Yamada teaches a buffer layer or layers of *gallium oxide* and/or indium oxide (col. 4, lines 17-22 and 38-46; and Fig. 7).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic oxide layer or derivative layer thereof described by Fujimori with wherein the metallic oxide layer or derivative layer thereof comprises gallium because a metallic oxide layer or derivative layer thereof of gallium would have been functionally equivalent as a buffer layer in a solar cell as taught by Yamada (col. 4, lines 17-22 and 38-46; and Fig. 7).

It has been held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination (MPEP § 2144.06 and § 2144.07).

VI. Claim **15** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Fujimori et al.** (US Patent No. 6,683,244 B2) as applied to claims 1-4, 7, 14 and 17 above, and further in view of **Eisenbeiser et al.** (US Patent Application Publication No. 2003/0015700 A1) and **Arao et al.** (US Patent No. 5,244,509).

Fujimori is as applied above and incorporated herein.

The element of Fujimori differs from the instant invention because Fujimori does not disclose wherein the metallic oxide layer or derivative layer thereof comprises arsenic, as recited in claim 15.

Like Fujimori, Eisenbeiser teaches solar cells. Eisenbeiser teaches that a suitable template for a buffer layer includes strontium-oxide-*arsenic* (Sr-O-As) [page 4, [0048]].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic oxide layer or derivative layer thereof described by Fujimori with wherein the metallic oxide layer or derivative layer thereof comprises antimony because a metallic oxide layer or derivative layer thereof of arsenic would have been functionally equivalent as a buffer layer in a solar cell as taught by Eisenbeiser (page 4, [0048]).

It has been held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination (MPEP § 2144.06 and § 2144.07).

Furthermore, Arao teaches solar cells. Arao teaches that the buffer layer is

composed of a material selected from a material containing magnesium fluoride as the principal component, oxides, nitrides and carbides of indium, tin, cadmium, zinc, *antimony*, silicon, chromium, silver, copper, aluminum or magnesium (col. 5, lines 1-6).

Arsenic is also a Group VB element as antimony. One having ordinary skill in the art would have expected that the substitution of one Group VB element for another would have been functionally equivalent.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
November 5, 2008